chief representative of the rock-building coralline algæ.

CRETACEOUS.

We here reach the period when Lithothamnion and its allies begin to make their appearance. They have not yet been recognised in British rocks, but are widely distributed in Continental deposits. They occur in the Cenomanian of France, in the Sarthe and the Var, but especially in the Danian of Petersburg, near Maestricht.

Other forms which may be mentioned are Diplopora and Triploporella. The former is met with abundantly in the lower Schrattenkalk in certain districts, especially Wildkirchli, where it plays a considerable part in the formation of the deposit.[33]

TERTIARY.

In Britain no important deposits of marine calcareous algæ have yet been reported, but considerable deposits of limestone, rich in remains of Chara, have for long been known from the Oligocene of the Isle of Wight.

Foreign Tertiary.

On the Continent, however, large deposits rich in Lithothamnion and Lithophyllum have been known for many years, among which I may mention the well-known Leithakalk of the Vienna Basin and Moravia. It will be remembered that it was these deposits which formed the subject of Unger's important monograph in 1858.

CONCLUSIONS.

The facts given above regarding the geological distribution and mode of occurrence of these organisms lead us to several interesting conclusions. In addition to the evidence of the important part they play as rock-builders, it is evident that certain forms flourished over wide areas at the same geological periods, and might well be made use of in many cases with considerable reliability as proofs of the general contemporaneity of two deposits. Thus, as general examples, we may cite the wide distribution of *Solenopora compacta* in the Baltic provinces, Scotland, England, Wales, and Canada during Llandilo-Caradoc times.

The wonderfully persistent development of the *Rhabdoporella* facies over the whole of the Baltic area at the close of Ordovician times was of so marked a character that by means of boulders scattered over the north German plain it can even be made use of for tracing the direction of flow of the ice-sheet during glacial times.

Again, to take examples nearer home. The Ortonella band found throughout Westmorland and north Lancashire near the summit of the Tournaisian occurs so constantly at the same horizon as to constitute one of the most valuable zonal indices in the succession of the north-west province, and can be used with the greatest confidence not only for correlating widely separated exposures, but also affords valuable evidence in the case of tectonic movements. Other examples are supplied by the "Girvanella nodular band" at the base of the Upper Dibunophyllum zone, and the *Mitcheldeania gregaria* beds in the north of England and the Forest of Dean.

Again, the presence of these organisms at a particular horizon furnish us with interesting evidence as to the conditions which obtained during the accumulation of these deposits.

At the present day calcareous algæ flourish best in clear but shallow water in bays and sheltered lagoons. As a good example we may take the algal banks in the Bay of Naples, described by Prof. Walther,[34] where Lithothamnion and Lithophyllum flourish to a depth of from 50–70 metres. There is seldom any muddy sediment on these banks, though detrital limestone fragments are widely distributed. Another interesting point is the constant association of fossil calcareous algæ with oolitic structure and also with dolomite.

Thus oolites occur in connection with Solenopora in the lower Cambrian of the Antarctic, in the Craighead limestone at Tramitchell in the Ordovician rocks of Christiania and the Silurian of Gotland and in the Lower Carboniferous limestone of Shap; while in the Jurassic rocks of Gloucestershire and Yorkshire it occurs in the heart of the most typical oolitic development to be met with in the whole geological succession. Though Mr. Wethered has made out a good case for the constant association of Girvanella tubes with oolitic grains, there are many cases in which their association cannot be traced. M. Cayeux,[35] in writing of a mass of Girvanella from the ferruginous oolites of the Silurian rocks of La Ferrière-aux-Etangs, expresses his opinion that Girvanella encrusts the oolite grains but does not form them, and that it is really a perforating alga of a parasitic nature.

The presence of dolomites in connection with algal deposits at different geological horizons appears to have taken place under definite physiographical conditions similar to those which obtain to-day in the neighbourhood of coral reef. Such lagoon conditions would come into existence *either* during a period of subsidence *or* elevation, and this is just what we find when we examine the periods at which these reefs are most persistent.

Thus the Girvan Ordovician reef occurred during an elevation which culminated with the deposition of the Benan Conglomerate; the Lower Carboniferous Algal band in Westmorland was laid down during the subsidence which followed the Old Red Sandstone Continental period of the Upper Girvanella; modular band occurred when the Marine period of the Lower Carboniferous was drawing to a close and a general elevation was taking place. Similar conclusions could be drawn from other periods recorded above did time permit.

In concluding this address, I wish to express the hope that however imperfect the account I have given of the succession of forms may be, that it will help to stimulate an interest in these rock-building algæ and encourage geological workers in this country to turn their attention to a hitherto neglected group of forms of great stratigraphical importance.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

LEEDS.—Dr. Charles Crowther, formerly lecturer in agricultural chemistry, has been appointed professor in that subject, and will have charge of the experiments in animal nutrition, which are being supported by a grant from the Development Commissioners.

The Council of the University has granted six months' leave of absence to Prof. Smithells, who is leaving England on September 26 to proceed to Lahore, where he is to give a course of lectures and to assist the Punjab University in other ways in the promotion of scientific education and research.

The position of research chemist to the Joint Committee on Ventilation Research of the Institution of Gas Engineers and of the University of Leeds has

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[33] Lorenz, 1908.

[34] "Zeitsch. d. deut. Geol. Ges." 1885, p. 230, and "Abh. d. Königl. Preuss. Akad. der Wiss," 1910.

[35] *Comptes Rendus Acad. de Sci.*, 1910, p. 359.

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been filled by the appointment of Mr. W. Harrison, of the Manchester Municipal School of Technology.

The medical school of the University of Leeds will hold its opening function on October 1, when Prof. C. S. Sherrington, F.R.S., will distribute the prizes and deliver an address.

LONDON.—Prof. E. W. MacBride, F.R.S., has been appointed successor to the late Prof. Adam Sedgwick in the chair of zoology at the Imperial College of Science, South Kensington.

THE presidency of Denison University has been accepted by Prof. C. W. Chamberlain, who, in consequence, has resigned the chair of physics at Vassar College.

THE new session of the Charing Cross Hospital Medical College will be opened on October 1 by an address from the dean, Dr. W. Hunter, on University medical education.

THE first Hunterian Society's lecture will be delivered at St. Bartholomew's Hospital on October 8 by Dr. F. J. Wethered, who will take as his subject "Fever in Pulmonary Tuberculosis: its Significance and Therapeutical Indications."

A CHAIR of hydrology and hygiene has been established at the Superior School of Pharmacy in Paris, which will take the place of one of mineralogy and hydrology. Prof. Délépine, the holder of the last-named chair, will occupy the new one.

DR. J. E. WODSEDALEK, of the zoological department of the University of Wisconsin, has been appointed professor of zoology and head of the department of zoology and entomology at the University of Idaho, Moscow, Idaho, in succession to Dr. J. M. Aldrich.

AN apprenticeship course in animal husbandry has been established at the Ohio State University. The course covers four years—two in the university and two in practical work on a stock farm. Many stock men in the United States are interested in the movement, and are cooperating with the University in carrying it out.

WE learn from *Science* that a bionomic laboratory has been established in connection with the University of Chicago, and that Prof. W. L. Tower, who has been appointed its curator, has left for South America to obtain material for it. The laboratory is to be equipped for the study of genetics and the problems of experimental evolution.

A SCHEME has been completed for the amalgamation of Bolton Grammar School and the High School for Girls in the town, and Sir William Lever has now endowed them as from January next with 50,000*l*. Lever Brothers 20 per cent. cumulative preferred ordinary shares, producing an income of 10,000*l*. per annum. The funds are placed at the discretion of the trustees, and it is proposed to use the first five years' income to build a new school with an administrative block.

A SCIENTIFIC and technical school of kinematography is to be inaugurated at the Polytechnic, Regent Street, W., on Wednesday, October 1. The opening meeting (which will be free) is to be followed by a course of twenty-four weekly lectures by Mr. R. Bruce Foster, who will deal with the subject under the following heads:—Historical development; modern film machines and intermittence mechanisms; films, their production and treatment; exhibiting; colour kinematography; the kinematograph combined with musical accompaniment; the Kinematograph Act and Regulations.

THE following lectures, among others, have been arranged for delivery at University College, London:—"Early Cylinders and Scarabs," Prof. Flinders Petrie, F.R.S.; "Primitive Religion in Egypt," Miss Margaret A. Murray; "The Scope of General Physiology," Prof. Bayliss, F.R.S.; "The Range of Consciousness in Organic Nature," Mr. Carveth Read; "Mental Energy," Prof. Spearman; "The Palæobotanist, his Past and Future," Dr. Marie Stopes. Particulars, syllabuses, &c., may be obtained from the Provost or the Secretary of the College.

AT University College, University of London, a course of lectures on the physical applications of the principle of relativity will be delivered on Fridays, at 5 p.m., by Dr. L. Silberstein, lecturer in natural philosophy at the University of Rome, beginning October 10. The syllabus includes consideration of the fundamental concepts and postulates of the theory of relativity, dynamics of radiation, fundamental electromagnetic equations, optical problems, the problem of gravitation, and Einstein's recent generalisation of the theory of relativity. Another course of lectures on the principle of relativity is to be given at Battersea Polytechnic by Mr. E. Cunningham, fellow of Trinity College, Cambridge, on Thursdays, at 6 p.m., beginning on October 23. The lectures will deal with the development of the principle and some consequences of the universal admission of the principle. Admission to this course is free and no ticket is required.

THE next session of Birkbeck College, which is the ninety-first, commences on September 29. The opening address will be given at 7 p.m. by Sir Francis Darwin, F.R.S., and visitors are invited to be present. The college is conducted in relation with the University of London, and classes are held both in the day and evening. We notice that thirty-two members of the staff are recognised teachers of the University of London. The courses of study provide for degrees in the faculties of arts, science, laws, and economics. It is again pointed out in the calendar, which contains full particulars of the numerous courses of study, that the usefulness of the college is curtailed by its limited accommodation. Its most pressing need is for increased space. More spacious college buildings, with additional class-rooms and larger laboratories better adapted to modern requirements, would give a great stimulus to the work of the college and add to its public utility.

THE report of the United States Commissioner of Education for the year ending June 30, 1912, has reached us from Washington. It consists of two large volumes, one dealing with educational topics in a broad way and the other devoted almost entirely to statistics. The section of the report concerned with the work of universities and colleges in the United States shows that the total amount of gifts to these institutions for higher education for the year 1911–12 was 4,956,600*l*., excluding grants by Federal, State, and local political bodies. This amount represents an increase of 363,989*l*. over the benefactions for 1910–11. Of these gifts 1,274,960*l*. was for the increase of plant in the institutions, 745,980*l*. for current expenses, and 2,935,660*l*. for endowment. These amounts do not include subscriptions or promises received in campaigns for endowment, though they do include some property not producing an income at the present time. Fifty-four institutions reported gifts during the year of more than 20,000*l*. Five universities received more than 200,000*l*., namely, Yale, Chicago, Harvard, Columbia, and Cornell. Columbia University seems to have been most fortunate with its 378,256*l*.

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